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DO EUROPEAN INDUSTRIAL MARKETERS BUDGET
DIFFERENTLY?
AN INTERNATIONAL COMPARISON VIA THE ADVISOR MODEL

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Abstract

This paper presents a cross-national study of industrial marketing communications spending. The study compares the results of data collected from 55 European companies on 80 products with a sample of 131 products from 29 companies representing the ADVISOR 2 study sample in the U.S.

Several key questions are addressed. First, we consider if the original ADVISOR results are specific to U.S. companies. We also consider if budgeting norms are time dependent, i.e., whether the structure of the budgeting process has changed over time.

The main results show that (a) the same strategic variables have about the same power in explaining variations in marketing spending patterns in the U.S. as in Europe, (b) the overall relationship between the strategic variables and advertising and marketing spending levels is not different between the U.S. and Europe, and (c) although some differences exist in the importance of individual strategic variables between the U.S. and Europe, those differences are generally small.

Implications for marketing managers as well as directions for future research are discussed.

One should expect the size and structure of industrial marketing budgets to vary between the U.S. and Europe. Marketing programs in Europe deal with smaller geographical areas and generally deal with different customer profiles. The actual differences in monetary level of spending are not as important, however, as is an understanding of whether budgeting behavior per se is different between the two continents. In other words, the interesting question is whether the paradigm with which the American manager works is different from that of his European counterpart.

An ideal test of this hypothesis would be to transplant managers across the Atlantic and observe whether they spend differently in their new environment. Practically such a test is infeasible.

As an alternative, the experience gained through the ADVISOR studies allows us to learn which considerations marketing managers use in formulating industrial marketing budgets and how those considerations are used.

In this study we sought a collective European Industrial Marketing wisdom as was found in the U.S. After a brief description of the American experience, we describe the rationale behind our comparison, suggest research hypotheses and report the results. We then evaluate how this study has added to our knowledge of the cross-national generality of the process of setting marketing budgets for industrial products.

1. Background on the ADVISOR Studies

As Webster (1978) has pointed out, industrial marketing, accounting for well over half of all economic activity, has not received nearly its proportional share of attention in the professional literature and in academic research. Much of the work in the area "... is trivially descriptive, ... based on small unrepresentative samples ... and naively unaware of real world complexity." (p. 21).

A word that is appropriately used to explain this lack of quantified intelligence, is complexity; industrial markets often consist of small numbers of potential customers, are concentrated geographically, and show large variation in customer size. Demand for industrial products is "derived demand" as opposed to the primary demand found in consumer markets and there are often many fewer sales transactions for larger dollar amounts in industrial than in consumer markets. This issue of complexity suggests that quantified marketing intelligence developed in the consumer marketing context, is not directly applicable to industrial markets.

Companies selling industrial products all face the marketing mix decision: how much should be spent and how should funds be allocated to such activities as direct sales, customer service and marketing communications (advertising, and other customer-directed promotions)? Each company brings experience and thought to setting budgets and plans for industrial marketing expenditures; however, to a large degree, these decisions are based on impressions rather than fact. Logically prior to developing normative guidance for industrial marketers (suggesting what should be done), there is need for quantified intelligence about what is being done and why by practicing industrial marketers facing key problems. ADVISOR and the work reported here represents an attempt to add to knowledge of industrial marketing practice in the area of communications spending decisions.

In a review of industrial advertising budgeting practices, Lilien et al. (1976) reported that the most common methods for setting advertising budgets were: a) the Guidelines method, usually implying a constant percentage of past or anticipated sales, and b) the Task method, calling for explicit consideration of the relationship between marketing and communication objectives and the expenditure required to meet those objectives. These methods

have not been found to be cure-alls. Most guidelines methods do not provide justification for the percentage to be applied against sales. Task methods have difficulty relating intermediate communications measures to final sales objectives. Explicit modeling and experimentation, an alternative frequently considered in consumer markets, is rarely applied due to expense and implementation difficulties.

Yet, on the positive side, a large number of marketers have been making decisions for a long time and, in a "survival of the fittest" sense, they have been successful. In a pragmatic way, on average, they have converged through experience on good decisions; Bowman (1963) and Kunreuther (1969) in another area, have shown that analyses of past behavior can provide decision rules that are empirically valid. The approach of using such experience to provide business operating norms has been most significantly applied in the PIMS program (Schoeffler et al., 1974). The PIMS data have also been used by Buzzell and Farris (1976) and Farris and Buzzell (1979) to infer communications spending norms, and the ADVISOR studies (Lilien, 1979) were an attempt to apply the concept of shared experience explicitly to industrial product situations.

Reported work on the ADVISOR project covered five years, included 200 industrial products and involved nearly thirty participating companies. That research effort found that a significant fraction of the variation in advertising and marketing spending could be explained by a few product and market characteristics.

The two models that will be looked at in detail in this paper, the Advertising and the Marketing Spending models, have the following basic structure:

$$B_t = \beta_0 S_{t-1}^{\beta_1} U^{\beta_2} \prod_i C_{var_i}^{\beta_i} \prod_j D_{var_j}^{\beta_j}$$

where

B = Marketing or Advertising spending budget

S = Sales dollars

U = Number of individuals the marketing program must reach,

C_{var_i} = Continuous, independent variable i, transformed to be greater than 1,

D_{var_j} = 0-1 indicator for discrete, independent variable j.

2. Generality of ADVISOR results

To date, the ADVISOR studies are one in a line of studies aimed at developing a quantitative understanding of industrial marketing budget setting behavior (Galper and Lilien, 1981). A key question must be asked concerning the generality of the results (Farris and Buzzell, 1980): how much do the results reflect the peculiarities of the sample as opposed to more general phenomena? In particular:

i. Are the Results Specific to the Companies involved in the Study?

Although cross validation analyses suggest generally stable coefficients, those analyses were done among the 29 U.S. firms involved in the project. It would be desirable to compare the results with those from an outside sample of firms.

ii. Are the Results U.S.-specific?

All the data used in the ADVISOR analyses are for U.S. products or for the U.S. portion of an international product's sales. Are these norms, then, U.S.-specific or do they generalize to other countries?

iii. Are the Results Time Dependent?

The last year of data included in the ADVISOR sample was fiscal 1975. As several years have since passed, it is important to determine if these industrial marketing norms have changed over time.

The three questions above concerning the generality of the ADVISOR results motivate the analyses that we refer to as ADVISOR - EUROPE. Data for products from European companies were collected, analyzed and compared with the U.S. ADVISOR sample. These data present no overlap in the firms involved, addressing question i above. As all product sales are European, the sample provides a check on Question ii and as the data cover the period from 1978-1980, they provide a check on the stationarity of the results as well (Question iii).

3. ADVISOR-EUROPE

The ADVISOR-EUROPE analysis permits us to ask the following questions: Is there a "European" collective wisdom in industrial marketing that is essentially different from U.S. wisdom, as reflected in the ADVISOR models? What differences, if any, exist between Europe and the U.S.? Are the decision processes identical? Do they differ in terms of level? Do the same determinants have effect, but at different levels? Are the decision processes totally unrelated? If the results are essentially similar in Europe, then information captured in the ADVISOR Models will have been shown to have considerable generality and results from both studies may be pooled. If the results are essentially different, and in particular, if the U.S. models explain a significantly larger amount of the variation in U.S. spending than in European spending, the analysis might suggest a search for European-specific explanatory variables and the different roles of variables which seem significant in both environments.

With this motivation, the ADVISOR-Europe project, under the sponsorship of INSEAD, solicited data from its affiliated companies and marketing executives participating in the European Marketing Program. The companies who responded (55 in all) provided useable data on 80 products. As with the original ADVISOR project, no direct control over the representativeness of the product-sample was possible. Participating companies represented firms that marketed solely in Europe as well as European divisions of U.S.-based firms. Participating European-based firms included EMI Medical, ICL, Wiggins Teape, Ciba Geigy, AGA Gas, KLM Cargo, Bekaert, Robert Bosch, ICI and Siemens to name a few.

3.1 Data

ADVISOR-Europe utilized identical questions to those on the U.S. questionnaire that were found to be significant in explaining marketing budgeting behavior. Exhibits I compare the answers to selected questions from the European and USA samples. Exhibit I.1 shows that most major European countries are represented. About 8 of the questionnaires pertained to products that compete all across Europe instead of country by country. Exhibit I.2 compares product categories between the sample, with a somewhat different mix** of product-categories in the European sample. The major differences are the larger share of fabricated material and components products in the American sample as opposed to chemical and machinery firms in Europe. Exhibit I.3 compares the stage in the life cycle (Introduction and Decline products are not analyzed); the samples are remarkably similar. Exhibit I.4 gives customer concentration, with the European markets a bit more concentrated than U.S.

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** Differences in distributions were tested using a χ^2 test; this difference was found significant at the .001 level.

markets.** Exhibit I.5 compares market share distributions, and the market shares of the European sample are somewhat higher than the shares of the U.S. products.

Exhibit I.6 gives the Marketing/Sales ratio, Exhibit I.7 the Advertising/Sales ratio. Both these statistics are higher for the European than for the U.S. sample. In general, the European products see lower levels of sales; the original ADVISOR model predicts higher M/S and A/S ratios with lower levels of sales (Lilien, 1979). Exhibit I.8 gives the Advertising/Marketing ratio and the samples are quite similar.*

Exhibit I.9 summarizes some other data comparisons between the U.S. and European data, and provides the χ^2 statistics testing the differences between the two sets of distributions.

3.2 Hypotheses

This cross cultural comparison can be translated into three main hypotheses:

Hypothesis I: The variation in Marketing and Advertising budgets will be explained to a similar extent by the same set of strategic variables.

ADVISOR USA revealed a strong relationship between spending behavior and several strategic characteristics, which suggested that experienced industrial marketing managers use a small number of product and market variables in making spending decisions. ADVISOR EUROPE attempted to find whether European managers use the same considerations in determining their budgets. More specifically, the variables which explained the variation in U.S. spending were:

* M/S and A/S are statistically different at the .001 level while the A/M ratio distribution differences were not statistically significant.

** Differences in distributions were tested using a χ^2 test; this difference was found significant at the .001 level.

EXHIBIT 1.1 EUROPEAN SAMPLE DISTRIBUTION BY COUNTRY

Austria	1
Germany	11
Finland	2
Norway	1
Sweden	1
Holland	5
Italy	4
Great Britain	17
France	13
Spain	12
Denmark	2
Switzerland	1
Belgium	1
Europe-wide	8

EXHIBIT 1.2:

PRINCIPAL PRODUCT CATEGORY

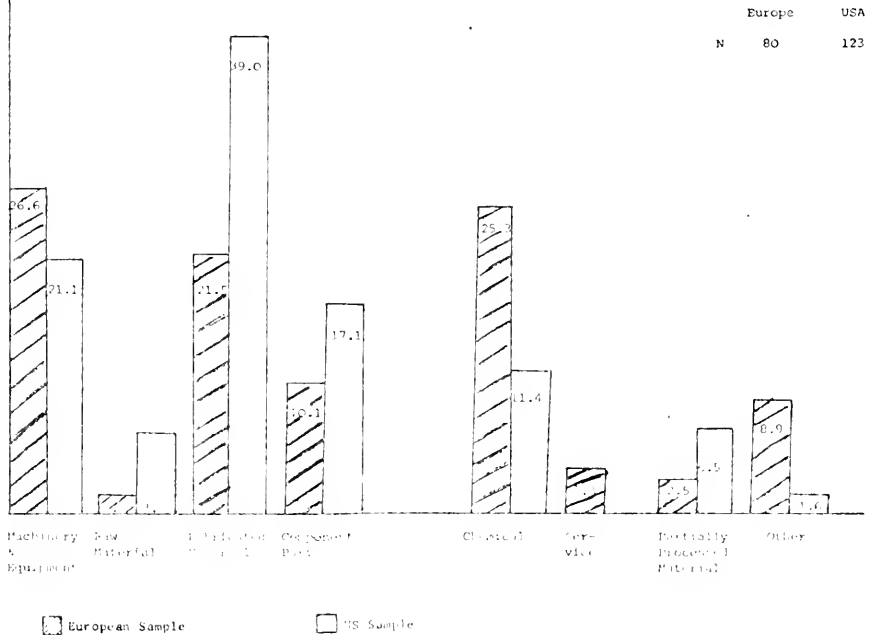


EXHIBIT I.3
STAGE IN LIFE-CYCLE

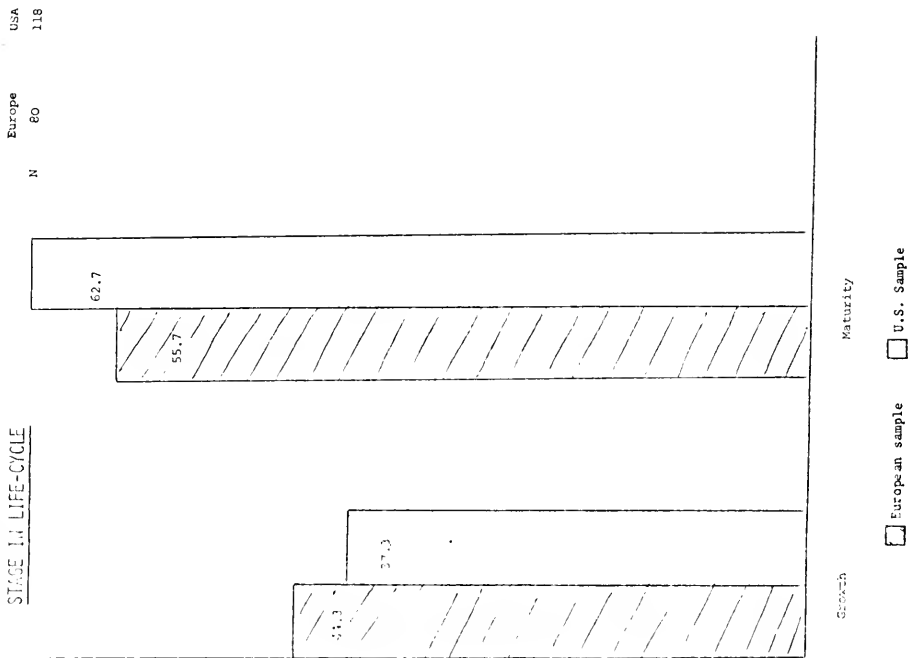


EXHIBIT I.4
FRACTION OF INDUSTRY SALES BY THREE LARGEST
CUSTOMERS

	Europe	USA
N	80	125
Mean	.25	.17
Median	.15	.072

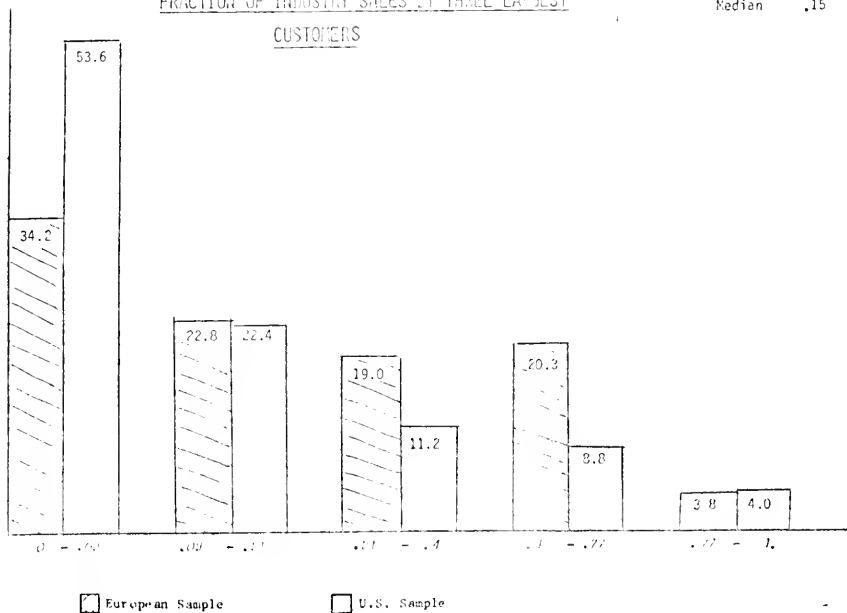


EXHIBIT 1.5

MARKET SHARE

	Europe	USA
N	80	119
Mean	.11	.25
Median	.21	.20

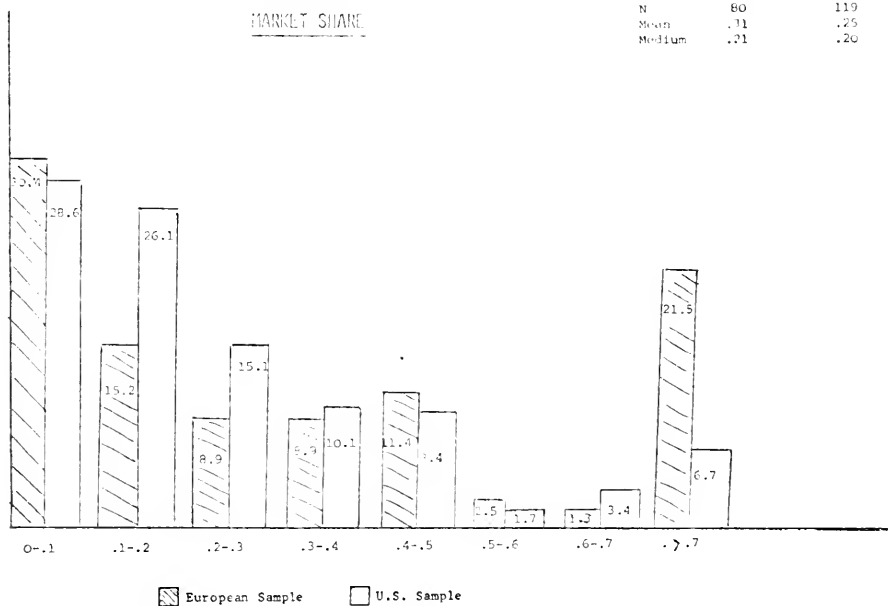


EXHIBIT 1.6

MARKETING / SALES

	Europe	USA
N	80	110
Mean	.16	.12
Median	.11	.07

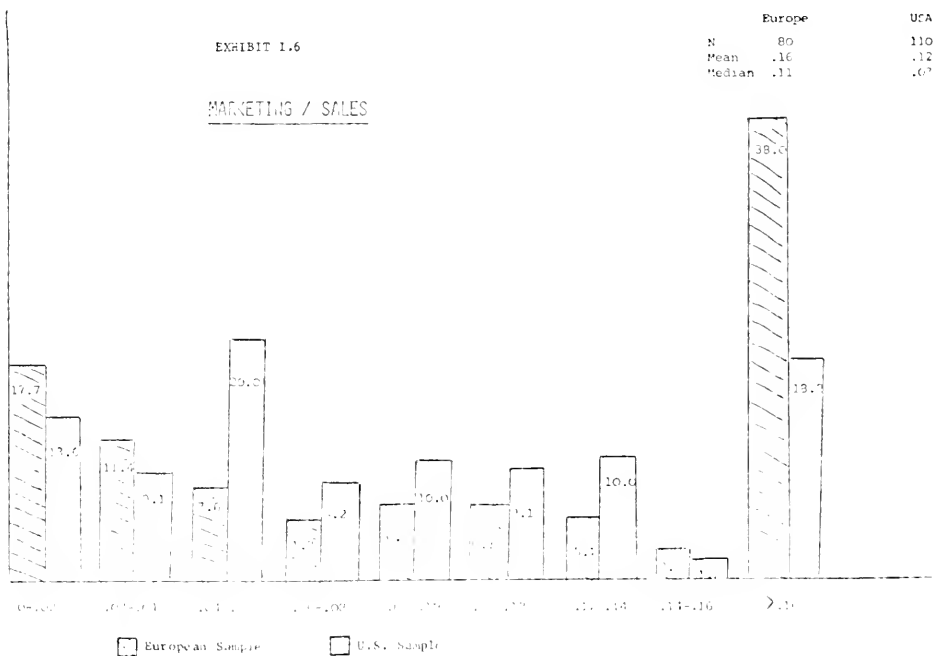


EXHIBIT I.9

SAMPLING OF OTHER U.S.-EUROPE DATA COMPARISONS

	<u>U.S. Mean</u>	<u>Europe Mean</u>	<u>$\chi^2(r-1)^c$</u>
Mean Perceived Product Quality (1-7 scale)	5.20	5.50	19.88 ^a
Number of Purchases/year (mean)	7.90	10.50	15.17 ^a
Fraction of volume produced to order (mean)	0.33	0.35	23.92 ^a
Percentage of sales to Independent Resellers (mean)	0.41	0.23	24.48 ^a
Average Number of Purchase Influences	3.00	2.40	12.61 ^a
Mean Importance of Technical Service (1-7 scale)	5.00	5.10	7.25
Number of Major Competitors (median)	6.00	5.30	8.25 ^b
Fraction of Industry Sales by Three Largest Customers (mean)	0.17	0.25	27.5 ^a

a=difference significant at .01 level.

b=difference significant at .1 level.

c=r refers to the number of categories in the frequency distribution.

Size of Advertising Budget

Sales
Number of users
Customer concentration
Fraction of sales made to order
Stage in life cycle
Product plans
Product complexity

Size of Marketing Budget

Sales
Number of users
Customer concentration
Fraction of sales made to order
Prospect-customer attitudes differences
Proportion of direct sales
Stage in life cycle
Product plans
Product complexity

Since the variables are strategic in nature we hypothesize they reflect the behavior of performance-driven managers in a free-enterprise Western economy. European managers are performance driven, and operate in a similar economic environment. As the technologies used in the industries represented in our sample are world-wide, and the distribution of industries is rather similar, we ~~felt~~ that this hypothesis was appropriate.

Hypothesis II: The overall relationship between Advertising and Marketing and the set of U.S.-based strategic variables will not be significantly different.

This hypothesis relates to actual spending norms. Although we may witness different actual spending behavior we suspect that those differences might be explained by differences in the circumstances in which they are spent rather than by differences in the approach to spending.

Hypothesis III: There will be no significant differences between the roles individual strategic variables play in spending decisions for Marketing and Advertising across the two samples.

This hypothesis addresses the relative roles that various strategic considerations play in industrial marketing budget decisions. A corollary of Hypothesis II is that if the set of strategic considerations is similar, and the overall spending levels for a given set of strategic circumstances is similar, then the relative roles of the strategic considerations must also be similar. However, a counter argument may hold that although spending for

a set of strategic circumstances may be similar, that similarity may be due to chance and reflect a counter-acting set of variables, working in different ways. Our hypothesis is, however, that no such differences will be found.

3.3 Results of Analysis

Hypothesis I: Explanation by Strategic Variables

Exhibit 2 presents the American Norm models for Marketing and Advertising spending alongside the corresponding U.S. specified models based on European data. The adjusted R^2 indicates the amount of variation in the dependent variables explained by the independent variables. For Marketing spending this statistic is 0.69 and 0.67 for the U.S. and Europe, respectively. For Advertising Budgets this statistic is 0.55 and 0.45, respectively.

Clearly, in the case of Marketing budgets the relative amount of explained variations is similar. Thus the same set of explanatory variables has been successful in explaining as much variation in European spending as in U.S. spending. As far as Advertising budgets are concerned, the analysis indicates that the same set of independent variables explains 10 percent more of the variation in the U.S. than in Europe. This could relate to the fact that regression coefficients for two independent variables, "Fraction of Sales Made to Order" and "Product Plans" were not statistically significant in Europe. In effect, it is probably due to the lower total value of variability in the dollar value of advertising spending in the European sample than in the U.S. sample.

Having followed the identical U.S. questionnaire and variables definitions we could not find variables that, while not significant in the U.S., were significant for Europe. On net, however, it appears that the same strategic variables have similar explanatory power in Europe as they had in the U.S. ADVISOR study.

EXHIBIT 2

ADVISOR USA AND EUROPE NORM MODELS FOR
MARKETING AND ADVERTISING BUDGETS

Independent Variable	Marketing Budget		Advertising Budget	
	U.S. Sample Regression Coefficient (+t value)	Eur. Sample Regression Coefficient (+t value)	U.S. Sample Regression Coefficient (+t value)	Eur. Sample Regression Coefficient (+t value)
Constant	0.187	-0.469	-0.342	-1.312
Sales	0.710 (12.72*)	0.681 (9.49)	0.576 (9.08)	0.528 (5.34)
Number of Users	0.079 (3.00)	0.106 (2.39)	0.105 (3.95)	0.214 (3.25)
Customer Concentration	-1.634 (3.18)	-0.579 (0.82)	-1.650 (2.81)	-2.193 (2.15)
Fraction of Sales Made to Order	-0.997 (2.81)	-0.100 (0.26)	-1.711 (4.21)	0.213 (0.37)
Prospect-customer Attitude Difference	-0.206 (1.11)	-0.018 (0.06)	--	--
Proportion of Direct Sales	0.179 (0.52)	0.166 (0.31)	--	--
Stage in Life Cycle	-0.428 (2.07)	-0.242 (0.89)	-0.864 (3.79)	-0.805 (2.18)
Product Plans	0.814 (3.87)	0.526 (1.99)	1.197 (4.87)	0.511 (1.29)
Product Complexity	0.548 (2.64)	0.841 (3.37)	--	--
Adjusted R ²	0.69	0.67	0.55	0.45
Sample Size	112	75	109	75
Chow Test Statistic	0.847		2.046	

* Note: t-stat in (*)

Hypothesis II: Overall Relationships Between Dependent and Independent Variables

In order to compare the regression equation for the two samples we use the approach suggested by Chow (1960)*. The test statistic is not statistically significant at the 10% level either for advertising or for marketing. We therefore cannot reject the null hypothesis of general overall structural equivalence between the U.S. and the European budgetting process.

Hypothesis III: Difference Between Individual Coefficients

The test for significant differences between individual regression coefficients was proposed by Gujarati (1970). It employs a dummy variable (1 if European; 0 if U.S.) in a pooled sample of both European and U.S. data. The dummy variable was then introduced in order to detect differences for the intercept and for each of the independent variables. A separate run was made for each individual independent variable.

Exhibit 3 displays the pooled Marketing and Advertising models along side the models that were re-specified following detection of significant differences between coefficients in the individual runs. The coefficient for fraction of sales made to order was the only variable in the Marketing model showing a significant difference for the two samples. The relatively low level of significance of the variable, however, makes it more a hypothesis for

* If we call \underline{e} the vector of disturbances in the pooled sample, \underline{e}_{US} the errors in the US sample and \underline{e}_{EUR} the vector of errors in the European sample, then under the null hypothesis:

$$C = \left\{ \frac{\underline{e}'\underline{e}}{\underline{e}_{US}'\underline{e}_{US} + \underline{e}_{EUR}'\underline{e}_{EUR}} - 1 \right\} \frac{N-2k}{k}$$

is distributed as F with k and N-2k degrees of freedom where

N = pooled sample size and k = number of parameters to be estimated.

EXHIBIT 3

POOLED ADVISOR MODEL WITH AND WITHOUT
DETECTED COEFFICIENT DIFFERENCE

Independent Variable	Marketing Budget		Advertising Budget	
	A** Regression Coefficient (+ t value)	B** Regression Coefficient (+ t value)	A** Regression Coefficient (+ t value)	B** Regression Coefficient (+ t value)
Constant	-0.005	-0.043	-0.627	-0.111
Sales	0.690(16.82)	0.706(10.12)	0.546(10.12)	0.553(10.08)
Number of Users	0.080 (3.63)	0.079 (3.58)	0.139 (5.17)	0.104 (3.45)
Customer Concentration	-1.228 (3.25)	-1.329 (3.43)	-1.890 (3.58)	-1.871 (3.53)
Fraction of Sales Made to Order	-0.481 (1.94)	-0.792 (2.57)	-0.696 (2.05)	-1.704 (3.65)
Prospect-Customer Attitude Difference	-0.104 (0.72)	-0.120 (0.84)	--	--
Proportion of Direct Sales	0.216 (0.80)	0.149 (0.55)	--	--
Stage in Life Cycle	-0.340 (2.27)	-0.327 (2.19)	-0.873 (4.32)	-0.845 (4.21)
Product Plans	0.649 (4.12)	0.693 (4.37)	0.809 (3.74)	1.197 (4.24)
Product Complexity	0.675 (4.45)	0.633 (4.14)	--	--
D* (Constant)	--	--	--	-0.019 (2.83)
D* (Number of users)	--	--	--	0.114 (1.92)
D* (Fraction of sales made to order)	--	0.648 (1.68)	--	1.890 (2.81)
D* (Product plans)	--	--	--	-0.702 (1.66)
Adjusted R ²	0.70	0.72	0.50	0.53
Sample Size	187		184	

* Starred variables are adjustments to individual coefficients in the pooled equation when the product is "European."

** Model A is a simple, pooled model; model B is the pooled model, augmented by statistically significant coefficient adjustments for the European sample.

further research than a clear difference. It reflects a higher spending response to the fraction of sales made to order in Europe, since the coefficient for the U.S. is -0.792 and it is changed to $-0.792 + 0.648 = -.144$ in Europe. This indicates that marketing budgets in Europe seem less sensitive to the fraction of sales made to order than are U.S. budgets.

For advertising budgets there are statistically significant differences for the intercept and for number of users, fraction of sales made to order and product plans. The difference in the intercept is small and only occurs in conjunction with the other differences. The fraction of sales made to order has a similar effect as in the Marketing equation; it reduces the amount of sensitivity in the advertising budget to the fraction of sales made to order in Europe. Thus, for U.S. products, Advertising spending is reduced considerably with more product specialization (-1.704); Europeans show little sensitivity: $1.890 - 1.704 = 0.186$, or essentially zero. Looking at the corresponding coefficients for the independent samples in Exhibit 2, we can see that the coefficient there is statistically significant for the U.S. and not for Europe. We conclude that this variable appears to be considered in the U.S. but not in Europe.

The second difference we see is for the number of users. Here the U.S. coefficient of 0.104 is augmented by 0.114 to $.218$ in Europe. This is similar to the results in Exhibit 2. We conclude that Europeans are more sensitive to the size of the audience they try to reach than are Americans. This is reasonable if one notes that advertising in Europe is more interpersonally-oriented (shows and exhibitions) than in the U.S. where it is more impersonal, using space advertising more heavily.

The third significant difference is in product plans. This variable is a highly sensitive consideration in the U.S. yet not significant in Europe according to Exhibit 2. Here again the definition of the variable may have posed a measurement problem (see Lilien, 1979, 1980a). However, Advertising spending does seem to be increased more with aggressiveness of product plans in the U.S. than in Europe; in the U.S. the coefficient is 1.197 while in Europe the coefficient is reduced by .702 to 0.495.

On net, our conclusions here cause us to reject the third hypothesis of no significant differences between the U.S. and Europe. For one variable in the Marketing equation and three variables in the Advertising equation, small but statistically significant differences are present.

4. Assessment and Uses

The objective of this research has been to investigate the cross-national validity and stability of industrial marketing budgeting behavior as reflected in the ADVISOR studies. The results presented here suggest that (a) the same strategic variables have about the same explanatory power in the U.S. as in Europe, (b) the overall relationship between strategic variables and spending levels is not significantly different between the U.S. and Europe, and (c) some (small) differences exist in the importance of individual strategic variables in Europe relative to the U.S.

Result (b) above shows that the ADVISOR results appear to have both cross-cultural as well as cross-temporal validity, since the European data were collected 3-4 years more recently than the U.S. data. Result (c) generally suggests a different style of advertising-use in Europe, where product plans and fraction of sales have less effect (product-company factors) while

the budget adjusts more radically to a key market factor, the number of users. European industrial marketing structure, with the heavier use of shows and sales promotion, most likely led to these differences. It should be noted that, while statistically significant, these differences appear to be more "the exception that proves the rule," in that the determinants of U.S. and European Advertising and Marketing spending patterns appear remarkably similar. What this appears to say is that a European marketing manager, placed in a U.S. environment would, on average, budget similarly to an American manager placed in that situation (and vice versa).

This research has provided, then, an updated set of advertising and marketing budgeting norms on a larger and more recent data set. These results show general cross-cultural stability. The results suggest that further in-depth study of European industrial marketing budgets, although possibly useful, is more likely to be of marginal value since the explanation of variation in spending is relatively good here. A useful direction for continuing research would, however, be the replication of this study in a few years and/or for other types of products (new products and industrial services in particular).

As with the prior ADVISOR analyses the models can be used in a variety of ways to help support industrial marketing decision-making. A key use is as a tool for managerial control. Here characteristics for an existing product are collected and input to a computer program. The program feeds back budgeting guidelines that are then compared with the actual budget. If the guidelines agree with the budget, no further analysis is performed. If they disagree, reasons for the differences are sought. Here, the model acts as a control procedure for exception analysis -- to find those product cases most in need of more detailed review. This use of the model -- providing budgeting norms -- was provided to the European data-donors as an incentive

for participation. Other modes of use are discussed in more detail in Lilien (1980b).

5. Conclusions

Often researchers hear from practitioners, "... my product (market, problem, etc.) is different." The objective of this research has been to determine whether significant differences in the determinants of industrial marketing budgeting behavior exist in Europe compared to the U.S. By and large, we found those differences to be small relative to the general similarities. We conclude that there appear to be a small number of strategic factors that influence budgeting behavior in the U.S. as well as in Europe and that spending differences stem largely from different circumstances. The identification and measurement of the impact of those factors is a step toward developing general quantitative understanding of and guidance for industrial marketing decision making.

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